Types of Nuclear Warfare

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The possibility of using nuclear weapons in war is usually divided into two subgroups, each with different effects and potentially fought with different types of nuclear armaments.

The first, a *limited nuclear war* (sometimes *attack* or *exchange*), refers to a small scale use of nuclear weapons by one or more parties. A "limited nuclear war" would consist of a limited exchange between two nuclear powers targeting each other's military facilities, either as an attempt to pre-emptively cripple the enemy's ability to attack as a defensive measure or as a prelude to an invasion by conventional forces as an offensive measure. This term would apply to any limited use of nuclear weapons, which may involve either military or civilian targets.[*[dubious](http://en.wikipedia.org/wiki/Wikipedia:Disputed_statement) –* [*discuss*](http://en.wikipedia.org/wiki/Talk:Nuclear_warfare#Dubious)][[*according to whom?*](http://en.wikipedia.org/wiki/Wikipedia:Neutral_point_of_view)]

The second, a *full-scale nuclear war*, consists of large numbers of weapons used in an attack aimed at an entire country, including military, economic and civilian targets. Such an attack would almost certainly destroy the entire economic, social, and military infrastructure of the target nation, and would possibly (depending on the severity of the nuclear exchange) have a devastating effect on Earth's biosphere.

Some [Cold War](http://en.wikipedia.org/wiki/Cold_War) strategists such as [Henry Kissinger](http://en.wikipedia.org/wiki/Henry_Kissinger)[7] argued that a limited nuclear war could be possible between two heavily armed superpowers (such as the [United States](http://en.wikipedia.org/wiki/United_States) and the [Soviet Union](http://en.wikipedia.org/wiki/Soviet_Union)) and if so several predicted that a limited war could "[escalate](http://en.wikipedia.org/wiki/Conflict_escalation)" into an all-out war. Others[*[who?](http://en.wikipedia.org/wiki/Wikipedia:Avoid_weasel_words)*] have called limited nuclear war "global nuclear holocaust in slow motion" arguing that once such a war took place others would be sure to follow over a period of decades, effectively rendering the planet uninhabitable in the same way that a "full-scale nuclear war" between superpowers would, only taking a much longer and more agonizing path to reach the same result.

Even the most optimistic predictions of the effects of a major nuclear exchange foresee the death of a hundred million people within a very short amount of time; more pessimistic predictions argue that a full-scale nuclear war could bring about the [extinction of the human race](http://en.wikipedia.org/wiki/Human_extinction) or its near extinction with a handful of survivors (mainly in remote areas) reduced [quality of life](http://en.wikipedia.org/wiki/Quality_of_life) and [life expectancy](http://en.wikipedia.org/wiki/Life_expectancy) for centuries after and cause permanent damage to most complex life on the planet, Earth's ecosystems, and the global climate, particularly if predictions of [nuclear winter](http://en.wikipedia.org/wiki/Nuclear_winter) are accurate. It is in this latter mode that nuclear warfare is usually alluded to as a [doomsday](http://en.wikipedia.org/wiki/Doomsday_device) scenario.[*[according to whom?](http://en.wikipedia.org/wiki/Wikipedia:Neutral_point_of_view)*] Such hypothesized civilization-ending nuclear wars have been a staple of the [science fiction](http://en.wikipedia.org/wiki/Science_fiction) literature and film genre for decades.

Either a limited or full-scale nuclear exchange could be an *accidental nuclear war*, in which a nuclear war is triggered unintentionally. Possible triggers for this scenario have included malfunctioning early warning devices and targeting computers, deliberate malfeasance by rogue military commanders, accidental straying of planes into enemy airspace, reactions to unannounced missile tests during tense diplomatic periods, reactions to military exercises, mistranslated or misscommunicated messages, and so forth. A number of these scenarios did actually occur during the Cold War, though none resulted in a nuclear exchange.[8] Many such scenarios have been depicted in [popular culture](http://en.wikipedia.org/wiki/Nuclear_weapons_in_popular_culture), such as in the 1962 novel [*Fail-Safe*](http://en.wikipedia.org/wiki/Fail-Safe_(novel)) (released as a film in 1964) and the film [*Dr. Strangelove or: How I Learned to Stop Worrying and Love the Bomb*](http://en.wikipedia.org/wiki/Dr._Strangelove_or:_How_I_Learned_to_Stop_Worrying_and_Love_the_Bomb), also released in 1964.

History

*Main article:* [*History of nuclear weapons*](http://en.wikipedia.org/wiki/History_of_nuclear_weapons)

**Hiroshima to Semipalatinsk**

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Mushroom cloud from the atomic explosion over Nagasaki rising 60,000 feet into the air on the morning of August 9, 1945.

The [United States](http://en.wikipedia.org/wiki/United_States) is the only nation to have ever used nuclear weapons during war, [using two atomic bombs](http://en.wikipedia.org/wiki/Atomic_bombings_of_Hiroshima_and_Nagasaki) on the [Japanese](http://en.wikipedia.org/wiki/Japan) cities of [Hiroshima](http://en.wikipedia.org/wiki/Hiroshima) and [Nagasaki](http://en.wikipedia.org/wiki/Nagasaki,_Nagasaki) in 1945.

Immediately after the bombings of Japan, the status of atomic weapons in international and military relations was unclear. Presumably, the United States hoped atomic weapons could offset the Soviet Union's superior conventional ground forces in Eastern Europe, and possibly be used to pressure Soviet leader [Joseph Stalin](http://en.wikipedia.org/wiki/Joseph_Stalin) into concessions. Stalin pursued his own atomic capabilities through scientific research and espionage against the American program. The Soviets believed that the Americans, with their limited nuclear arsenal, were unlikely to engage in any new world wars, while the Americans were not confident they could prevent a Soviet takeover of Europe, despite their atomic advantage.

Within the United States the authority to produce and develop nuclear weapons was removed from military control and put instead under the civilian control of the [United States Atomic Energy Commission](http://en.wikipedia.org/wiki/United_States_Atomic_Energy_Commission). This decision reflected an understanding that nuclear weapons had unique risks and benefits separate from other military technology.

[Convair B-36](http://en.wikipedia.org/wiki/Convair_B-36) bomber

For several years after [World War II](http://en.wikipedia.org/wiki/World_War_II), the US developed and maintained a strategic force based on the [Convair B-36](http://en.wikipedia.org/wiki/Convair_B-36) bomber that would be able to attack any potential enemy from bomber bases in the US. It deployed atomic bombs around the world for potential use in conflicts. Over a period of a few years, many in the US defense community became increasingly convinced of the invincibility of the United States to a nuclear attack. Indeed, it became generally believed that the threat of nuclear war would deter any strike against the United States.

Many proposals were suggested to put all US nuclear weapons under international control—for example, by the newly formed [United Nations](http://en.wikipedia.org/wiki/United_Nations) — as an effort to deter both their usage and an arms race. However no terms could be arrived at that would be agreed upon by both the US and the USSR.

US and USSR nuclear stockpiles.

On August 29, 1949 the [USSR](http://en.wikipedia.org/wiki/Union_of_Soviet_Socialist_Republics) tested its [first nuclear weapon](http://en.wikipedia.org/wiki/RDS-1) at [Semipalatinsk](http://en.wikipedia.org/wiki/Semipalatinsk_Test_Site) in [Kazakhstan](http://en.wikipedia.org/wiki/Kazakhstan) (see also [Soviet atomic bomb project](http://en.wikipedia.org/wiki/Soviet_atomic_bomb_project)). Scientists in the United States from the Manhattan Project had warned that, in time, the Soviet Union would certainly develop nuclear capabilities of its own. Nevertheless, the effect upon military thinking and planning in the US was dramatic, primarily because American military strategists had not anticipated the Soviets would "catch up" so soon. However, at this time, they had not discovered that the Russians had conducted significant espionage of the project from spies at Los Alamos, the most significant of which was done by the theoretical physicist [Klaus Fuchs](http://en.wikipedia.org/wiki/Klaus_Fuchs). The first Soviet bomb was more or less a deliberate copy of the [Fat Man](http://en.wikipedia.org/wiki/Fat_Man) device.

With the monopoly over nuclear technology broken, worldwide nuclear proliferation accelerated. The [United Kingdom](http://en.wikipedia.org/wiki/United_Kingdom) tested its first independent atomic bomb in 1952, followed by [France](http://en.wikipedia.org/wiki/France) in 1960 and then the [People's Republic of China](http://en.wikipedia.org/wiki/People%27s_Republic_of_China) in 1964. While much smaller than the arsenals of the USA and the USSR, Western Europe's nuclear reserves were nevertheless a significant factor in strategic planning during the [Cold War](http://en.wikipedia.org/wiki/Cold_War). A top-secret [white paper](http://en.wikipedia.org/wiki/White_paper) produced for the British Government in 1959, compiled by the [Royal Air Force](http://en.wikipedia.org/wiki/Royal_Air_Force), estimated that British atomic bombers were capable of destroying key cities and military targets in the Soviet Union, with an estimated 16 million deaths in the USSR (half of whom were estimated to be killed on impact and the rest fatally injured) *before* bomber aircraft from the United States' [Strategic Air Command](http://en.wikipedia.org/wiki/Strategic_Air_Command) reached their targets.

**The 1950s**

Though the USSR had nuclear weapon capabilities in the beginning of the [Cold War](http://en.wikipedia.org/wiki/Cold_War), the US still had an advantage in terms of bombers and weapons. In any exchange of hostilities, the US would have been capable of bombing the USSR, while the USSR would have more difficulties arranging the reverse.

The widespread introduction of [jet](http://en.wikipedia.org/wiki/Jet_engine)-powered [interceptor aircraft](http://en.wikipedia.org/wiki/Interceptor_aircraft) upset this imbalance somewhat by reducing the effectiveness of the US bomber fleet. In 1949 [Curtis LeMay](http://en.wikipedia.org/wiki/Curtis_LeMay) was placed in command of the [Strategic Air Command](http://en.wikipedia.org/wiki/Strategic_Air_Command) and instituted a program to update the bomber fleet to one that was all-jet. During the early 1950s the [B-47](http://en.wikipedia.org/wiki/B-47) and [B-52](http://en.wikipedia.org/wiki/B-52_Stratofortress) were introduced, providing the ability to bomb the USSR more easily. Before the development of a capable strategic missile force in the Soviet Union, much of the war-fighting doctrine held by western nations revolved around using a large number of smaller nuclear weapons used in a tactical role. It is debatable whether such use could be considered "limited" however, because it was believed that the US would use their own strategic weapons (mainly bombers at the time) should the USSR deploy any kind of nuclear weapon against civilian targets. [Douglas MacArthur](http://en.wikipedia.org/wiki/Douglas_MacArthur), an American general, was fired by President [Harry Truman](http://en.wikipedia.org/wiki/Harry_Truman), partially because he persistently requested permission to use his own discretion in deciding whether to use atomic weapons on the [People's Republic of China](http://en.wikipedia.org/wiki/People%27s_Republic_of_China) in 1951 (as the [Korean War](http://en.wikipedia.org/wiki/Korean_War) was raging).[9][[*dead link*](http://en.wikipedia.org/wiki/Wikipedia:Link_rot)]

Several scares about the increasing ability of the USSR's strategic bomber forces surfaced during the 1950s. The defensive response by the US was to deploy a fairly strong layered defense consisting of [interceptor aircraft](http://en.wikipedia.org/wiki/Interceptor_aircraft) and [anti-aircraft missiles](http://en.wikipedia.org/wiki/Anti-aircraft_missile), like the [Nike](http://en.wikipedia.org/wiki/Project_Nike), and guns, like the [Skysweeper](http://en.wikipedia.org/wiki/Skysweeper), near larger cities. However this was a small response compared to the construction of a huge fleet of nuclear bombers. The principal nuclear strategy was to massively penetrate the USSR. Because such a large area could not be defended against this overwhelming attack in any credible way, the USSR would lose any exchange.

This logic became ingrained in US nuclear doctrine and persisted for the duration of the [Cold War](http://en.wikipedia.org/wiki/Cold_War). As long as the strategic US nuclear forces could overwhelm their USSR counterparts, a Soviet preemptive strike could be averted. Moreover, the USSR could not afford to build any reasonable counterforce as the economic output of the United States was far larger than that of the Soviets, and they would be unable to achieve nuclear parity.

Soviet nuclear doctrine, however, did not match US nuclear doctrine[*[citation needed](http://en.wikipedia.org/wiki/Wikipedia:Citation_needed)*]. Soviet planning expected a large-scale nuclear exchange followed by a conventional war which itself would involve heavy use of tactical nuclear weapons. Unfortunately, US doctrine rather assumed that Soviet doctrine was similar—the *mutual* in [Mutually Assured Destruction](http://en.wikipedia.org/wiki/Mutually_Assured_Destruction) necessarily requiring that the other side see things in much the same way, rather than believing, as the Soviets did, that they could fight a large-scale, combined nuclear and conventional war.

A revolution in nuclear strategic thought occurred with the introduction of the [intercontinental ballistic missile](http://en.wikipedia.org/wiki/Intercontinental_ballistic_missile) (ICBM), which the USSR first successfully tested in August 1957. In order to deliver a warhead to a target, a missile was more cost-effective than a bomber, and enjoyed a higher survivability due to the enormous difficulty of interception of the ICBMs due to their high altitude and speed. The USSR could now afford to achieve nuclear parity with the US in terms of raw numbers, although for a time they appeared to have chosen not to.

Photos of Soviet missile sites set off a wave of panic in the US military, something the launch of [Sputnik](http://en.wikipedia.org/wiki/Sputnik) would do for the public a few months later. Politicians, notably then-[US Senator](http://en.wikipedia.org/wiki/United_States_Senate) [John Kennedy](http://en.wikipedia.org/wiki/John_Fitzgerald_Kennedy) suggested a "[missile gap](http://en.wikipedia.org/wiki/Missile_gap)" between the Soviets and the US. The US military gave missile development programs the highest national priority, and several [spy aircraft](http://en.wikipedia.org/wiki/Reconnaissance_aircraft) and [reconnaissance satellites](http://en.wikipedia.org/wiki/Reconnaissance_satellite) were designed and deployed to observe Soviet progress.

**1960s**

[RF-101 Voodoo](http://en.wikipedia.org/wiki/F-101_Voodoo) reconnaissance photograph of the MRBM launch site in [San Cristobal, Cuba](http://en.wikipedia.org/wiki/San_Cristobal,_Cuba) (1962).

Issues came to a head during the [Cuban Missile Crisis](http://en.wikipedia.org/wiki/Cuban_Missile_Crisis) in 1962. The Soviet Union placed medium range missiles 90 miles (140 km) from the US - a move considered by many[*[who?](http://en.wikipedia.org/wiki/Wikipedia:Avoid_weasel_words)*] as a direct response to American [Jupiter missiles](http://en.wikipedia.org/wiki/Jupiter_missile) placed in Turkey. After intense negotiation, the Soviets ended up removing the missiles from Cuba and decided to institute a massive building program of their own. In exchange, the US dismantled its launch sites in Turkey, although this was done secretly and was not publicly revealed for over two decades. Khrushchev did not even reveal this part of the agreement when he came under fire by political opponents for mishandling the crisis.

By the late 1960s, the number of ICBMs and warheads was so high on both sides that it was believed either the USA or USSR was capable of completely destroying the other country's infrastructure. Thus a [balance of power](http://en.wikipedia.org/wiki/Balance_of_power_in_international_relations) system known as [mutually assured destruction](http://en.wikipedia.org/wiki/Mutually_assured_destruction) (*MAD*) came into being. It was thought that any full-scale exchange between the powers could not produce a victorious side and thus neither would risk initiating one.

One drawback of this doctrine was the possibility of a nuclear war occurring without either side intentionally striking first. Early [warning systems](http://en.wikipedia.org/wiki/Warning_system) were notoriously error-prone. On 78 occasions in 1979, for example, a "missile display conference" was called to evaluate detections potentially threatening to the North American continent. Some of these were trivial errors, spotted quickly. But several went to more serious levels. On September 26, 1983, [Stanislav Petrov](http://en.wikipedia.org/wiki/Stanislav_Petrov) received convincing indications of a US first strike launch against the USSR but positively identified the warning as a false alarm. Though it is unclear what role Petrov's actions played in preventing a nuclear war, he has been honored by the United Nations for his actions.

Similar incidents happened many times in the US, due to failed computer chips,[10] flights of geese, test programs, and bureaucratic failures to notify early warning military personnel of legitimate launches of test or weather missiles. For many years, US strategic bombers were kept airborne on a rotating basis round the clock, until the number and severity of accidents persuaded policymakers it was not worthwhile.[*[citation needed](http://en.wikipedia.org/wiki/Wikipedia:Citation_needed)*]

**1970s**

By the late 1970s, citizens in the US and USSR (and indeed the entire world) had been living with [MAD](http://en.wikipedia.org/wiki/Mutual_assured_destruction) for about a decade. It became deeply ingrained into the popular culture. Such an exchange would have killed many millions of individuals directly and possibly induced a [nuclear winter](http://en.wikipedia.org/wiki/Nuclear_winter) which could have led to the death of a large portion of humanity and, potentially, the collapse of global civilization.

On May 18, 1974, [India](http://en.wikipedia.org/wiki/India) conducted its first nuclear test in the [Pokhran](http://en.wikipedia.org/wiki/Pokhran) test range. The name of the operation was [Smiling Buddha](http://en.wikipedia.org/wiki/Smiling_Buddha) and India termed the test as a "peaceful nuclear explosion".

According to the 1980 [United Nations](http://en.wikipedia.org/wiki/United_Nations) report *General and Complete Disarmament: Comprehensive Study on Nuclear Weapons: Report of the Secretary-General*, it was estimated that in total there were approximately 40,000 nuclear warheads in existence at that time with a total yield of approximately 13,000 [megatons](http://en.wikipedia.org/wiki/Megaton). By comparison, when the volcano [Mount Tambora](http://en.wikipedia.org/wiki/Mount_Tambora) erupted in 1815 (turning 1816 into the [Year Without A Summer](http://en.wikipedia.org/wiki/Year_Without_A_Summer) due to the levels of ash expelled), it exploded with a force of roughly 1,000 megatons. Many people believed that a full-scale nuclear war could result in the [extinction of the human species](http://en.wikipedia.org/wiki/Human_extinction), though not all analysts agreed on the assumptions required for these models.

The idea that any nuclear conflict would eventually escalate was a challenge for military strategists. This challenge was particularly severe for the United States and its [NATO](http://en.wikipedia.org/wiki/NATO) allies because it was believed until the 1970s that a Soviet tank invasion of Western [Europe](http://en.wikipedia.org/wiki/Europe) would quickly overwhelm NATO conventional forces, leading to the necessity of escalating to tactical nuclear weapons.

A number of interesting concepts were developed. Early ICBMs were inaccurate, which led to the concept of [countervalue](http://en.wikipedia.org/wiki/Countervalue) strikes — attacks directly on the enemy population leading to a collapse of the enemy's will to fight. During the Cold War the USSR invested in extensive protected civilian infrastructure such as large nuclear-proof bunkers and non-perishable food stores. In the US, by comparison, smaller scale [civil defense](http://en.wikipedia.org/wiki/Civil_defense) programs were instituted starting in the 1950s where schools and other public buildings had basements stocked with non-perishable food supplies, canned water, first aid, [dosimeter](http://en.wikipedia.org/wiki/Dosimeter) and [Geiger counter](http://en.wikipedia.org/wiki/Geiger_counter) radiation measuring devices. Many of the locations were given "[Fallout Shelter](http://en.wikipedia.org/wiki/Fallout_Shelter)" designation signs. Also, [CONELRAD](http://en.wikipedia.org/wiki/CONELRAD) Radio information systems were adopted, whereby the commercial radio sector would broadcast on two AM frequencies in the event of a CD emergency. These two frequencies can be seen on 50's vintage radios on online auction sites and museums, with many of these radios still in use on tabletops across America. Also, the occasional backyard fallout shelter was built by private individuals.

This strategy had one major and possibly critical flaw, soon realised by military analysts but highly underplayed by the US military: Conventional [NATO](http://en.wikipedia.org/wiki/NATO) forces in the European theatre of war were outnumbered by similar Soviet and [Warsaw Pact](http://en.wikipedia.org/wiki/Warsaw_Pact) forces, and while the western countries invested heavily in high-tech conventional weapons to counter this imbalance, it was assumed that in case of a major Soviet attack (commonly perceived as the "red tanks rolling towards the [North Sea](http://en.wikipedia.org/wiki/North_Sea)" scenario) that NATO, in the face of conventional defeat, would soon have no other choice but to resort to tactical nuclear strikes. Most analysts agreed that once the first nuclear exchange had occurred, escalation to global nuclear war would become almost inevitable. According to then Secretary of State [Henry Kissinger](http://en.wikipedia.org/wiki/Henry_Kissinger) by 1976 the USA had a 6-to-1 advantage in the number of nuclear warheads over the Soviet Union.[11]

As missile technology improved, the emphasis moved to counter-force strikes: ones that directly attacked the enemy's means of waging war. This was the predominant doctrine from the late 1960s onwards. Additionally the development of warheads (at least in the US) moved towards delivering a small explosive force more accurately and with a "cleaner" blast (with fewer long-lasting [radioactive](http://en.wikipedia.org/wiki/Radioactivity) [isotopes](http://en.wikipedia.org/wiki/Isotope)). In any conflict therefore, damage would have been initially limited to military targets, there may well have been "withholds" for targets near civilian areas. The argument was that the destruction of a city would be a military advantage to the *attacked*. The enemy had used up weapons and a threat in the destruction while the attacked was relieved of the need to defend the city and still had their entire military potential untouched.

Only if a nuclear conflict were extended into a number of "spasm" strikes would direct strikes against civilians occur, as the more accurate weapons would be expended early; if one side were "losing", the potential for using less accurate submarine-launched missiles would occur.

**The 1980s**

Montage of the launch of a [Trident C4](http://en.wikipedia.org/wiki/Trident_missile) [SLBM](http://en.wikipedia.org/wiki/SLBM) and the paths of its reentry vehicles.

Primary targets for Soviet [ICBMs](http://en.wikipedia.org/wiki/ICBM) during the 1980s. The resulting [fall-out](http://en.wikipedia.org/wiki/Nuclear_fallout) is indicated with the darkest considered as "lethal" to relatively fall-out free yellow zones.

In the late seventies and early eighties the balance, in terms of nuclear weapons, shifted towards the Soviets[*[citation needed](http://en.wikipedia.org/wiki/Wikipedia:Citation_needed)*]. However, with the ascension to the presidency by [Ronald Reagan](http://en.wikipedia.org/wiki/Ronald_Reagan), the US renewed its commitment to a powerful military, which required large spending on military programs. These programs, originally part of President Jimmy Carter's defense budget, included spending on conventional and nuclear weapons systems, as well as defensive systems like [Strategic Defense Initiative](http://en.wikipedia.org/wiki/Strategic_Defense_Initiative).

Another major shift in nuclear doctrine was the development of the [submarine](http://en.wikipedia.org/wiki/Submarine)-launched ballistic (nuclear) missile, the [SLBM](http://en.wikipedia.org/wiki/Submarine-launched_ballistic_missile). It was hailed by some military theorists as a weapon that would make nuclear war less likely. SLBMs, which can move with stealth virtually anywhere in the world, give a nation a "[second strike](http://en.wikipedia.org/wiki/Second_strike)" capability. Before the advent of SLBMs, thinkers feared that a nation might be tempted to initiate a first strike if it felt confident that such a strike would incapacitate the nuclear arsenal of its enemy, making retaliation impossible. With the advent of SLBMs, no nation could be certain that a first strike would incapacitate its enemy's entire nuclear arsenal. To the contrary, it would have to fear a retaliatory second strike from SLBMs. Thus a first strike was much less of a feasible option, and nuclear war was held to be less likely.

However, it was soon realized that submarines could "sneak up" close to enemy coastlines and decrease the warning time—the time between detection of the launch and impact of the missile—from as much as half an hour to under three minutes. This effect was especially significant to the United States, Britain, and China, with their capitals all within 100 miles (160 km) of their coasts. Moscow was more secure from this type of threat. This greatly increased the credibility of a "surprise first strike" by one of the factions and theoretically made it possible to knock out or disrupt the [chain of command](http://en.wikipedia.org/wiki/Chain_of_command) before a counterstrike could be ordered. It strengthened the notion that a nuclear war could be "won", resulting not only in greatly increased tension, and increasing calls for [fail-deadly](http://en.wikipedia.org/wiki/Fail-deadly) control systems, but also in a dramatic increase in military spending. The submarines and their missile systems were very expensive (one fully equipped nuclear powered nuclear missile submarine could easily cost more than the entire [GNP](http://en.wikipedia.org/wiki/Measures_of_national_income_and_output#Gross_National_Product) of a [third world](http://en.wikipedia.org/wiki/Third_world) nation),[12] but the greatest cost came in the development of both sea- and land-based anti-submarine defenses and in improving and strengthening the chain of command. As a result, military spending skyrocketed.

South Africa developed a nuclear weapon capability during the 1970s and early 1980s. It was operational for a brief period before being dismantled in the early 1990s.

On Sept. 1, 1983, [Korean Air Lines Flight 007](http://en.wikipedia.org/wiki/Korean_Air_Lines_Flight_007) was shot down by Soviet Jet Fighters. On the 26th, a Soviet early warning station under the command of [Stanislav Petrov](http://en.wikipedia.org/wiki/Stanislav_Petrov) falsely detected 5 inbound [intercontinental ballistic missiles](http://en.wikipedia.org/wiki/Intercontinental_ballistic_missile) from US. Petrov correctly assessed the situation as a false alarm, and hence did not report his finding to his superiors. It is quite possible that this prevented World War III, as the Soviet policy at that time was immediate nuclear response upon discovering inbound ballistic missiles.[*[citation needed](http://en.wikipedia.org/wiki/Wikipedia:Citation_needed)*]

The world came unusually close to nuclear war (although perhaps not as close as during the Cuban Missile Crisis) when the Soviet Union thought the NATO military exercise [Able Archer 83](http://en.wikipedia.org/wiki/Able_Archer_83) was a cover up to begin a nuclear strike. The Soviets responded by readying their nuclear arsenal. Soviet fears of an attack went away once the exercise concluded without incident.

**Post–Cold War**

Although the dissolution of the Soviet Union ended the Cold War and greatly reduced tensions between the United States and Russia (the Soviet Union's formal successor state), both nations remained in a "nuclear stand-off" due to the continuing presence of a significant number of warheads in both nations. Additionally, the end of the Cold War led the United States to become increasingly concerned with the development of nuclear technology by other nations outside of the former Soviet Union. In 1995, a branch of the US Strategic Command produced an outline of forward-thinking strategies in the document "[Essentials of Post–Cold War Deterrence](http://en.wikipedia.org/wiki/Essentials_of_Post%E2%80%93Cold_War_Deterrence)".

The former chair of the United Nations disarmament committee states there are more than 16,000 strategic and tactical nuclear weapons ready for deployment and another 14,000 in storage. The U.S. has nearly 7,000 ready for action and 3,000 in storage and Russia has about 8,500 on hand and 11,000 in storage, he said. [China](http://en.wikipedia.org/wiki/China) has 400 nuclear weapons, [Britain](http://en.wikipedia.org/wiki/United_Kingdom) 200, [France](http://en.wikipedia.org/wiki/France) 350, [India](http://en.wikipedia.org/wiki/India) 120, and [Pakistan](http://en.wikipedia.org/wiki/Pakistan) 90. [North Korea](http://en.wikipedia.org/wiki/North_Korea) is confirmed as having nuclear weapons, though it is not known how many (a common estimate is between 1 and 10). [Israel](http://en.wikipedia.org/wiki/Israel) is also widely believed to [have nuclear weapons](http://en.wikipedia.org/wiki/Nuclear_weapons_and_Israel). NATO has stationed 480 US nuclear weapons in Belgium, the Netherlands, Italy, Germany, and Turkey, with several other countries in pursuit of an arsenal of their own.[13]

A key development in nuclear warfare in the 2000s has been the [proliferation](http://en.wikipedia.org/wiki/Nuclear_proliferation) of nuclear weapons to the [developing world](http://en.wikipedia.org/wiki/Developing_world), with [India](http://en.wikipedia.org/wiki/India) and [Pakistan](http://en.wikipedia.org/wiki/Pakistan) both publicly testing nuclear devices and [North Korea](http://en.wikipedia.org/wiki/North_Korea) conducting an underground nuclear test on October 9, 2006. The US Geological Survey measured a 4.2 magnitude earthquake in the area where the test occurred. A further test was announced by the North Korean government on May 25, 2009.[14] [Iran](http://en.wikipedia.org/wiki/Iran), meanwhile, has embarked on a nuclear program which, while officially for civilian purposes, has come under scrutiny by the United Nations and individual states.

Recent studies undertaken by the [CIA](http://en.wikipedia.org/wiki/CIA) cite the enduring India-Pakistan conflict as the most likely to escalate into nuclear war. During the [Kargil War](http://en.wikipedia.org/wiki/Kargil_War) in 1999, Pakistan came close to using its nuclear weapons in case of further deterioration.[15] Pakistan's foreign minister had even warned that it would "use any weapon in our arsenal", hinting at a nuclear strike against India;[16] the statement was condemned by the international community with Pakistan denying it later on. It remains the only war between two declared nuclear powers. The [2001-2002 India-Pakistan standoff](http://en.wikipedia.org/wiki/2001-2002_India-Pakistan_standoff) again stoked fears of nuclear war between the two countries.

Despite these very serious threats, relations between India and Pakistan have been improving somewhat over the last few years. A bus line directly linking Indian and Pakistani-administered [Kashmir](http://en.wikipedia.org/wiki/Kashmir) has recently been established. However, with the [November 26, 2008 Mumbai terror attacks](http://en.wikipedia.org/wiki/2008_Mumbai_attacks), India does not rule out war with Pakistan.

Another flashpoint which has analysts worried is a possible conflict between the [United States](http://en.wikipedia.org/wiki/United_States) and the [People's Republic of China](http://en.wikipedia.org/wiki/People%27s_Republic_of_China) over [Taiwan](http://en.wikipedia.org/wiki/Taiwan). Although economic forces have decreased the possibility of military conflict, there remains the worry that increasing military buildup ([China](http://en.wikipedia.org/wiki/China) is rapidly increasing their naval capacity) and a move toward [Taiwan independence](http://en.wikipedia.org/wiki/Taiwan_independence) could spin out of control.

[Israel](http://en.wikipedia.org/wiki/Israel) is another possibility as it is thought to possess between one hundred and four hundred nuclear warheads. It has been asserted that the submarines which Israel received from [Germany](http://en.wikipedia.org/wiki/Germany) have been adapted to carry missiles with nuclear warheads, so as to give Israel a [second strike](http://en.wikipedia.org/wiki/Second_strike) capacity.[17] Israel has been involved in wars with its neighbours on numerous occasions, and its small geographic size would mean that in the event of future wars the Israeli military might have very little time to react to a future invasion or other major threat; the situation could escalate to nuclear warfare very quickly in some scenarios.

In the Persian Gulf, [Iran](http://en.wikipedia.org/wiki/Iran) appears to many observers to be in the process of developing a nuclear weapon, which has heightened fears of a nuclear conflict in the Middle East, either with Israel or with Iran's [Sunni](http://en.wikipedia.org/wiki/Sunni) neighbors.

**Potential consequences of a regional nuclear war**

A study presented at the annual meeting of the [American Geophysical Union](http://en.wikipedia.org/wiki/American_Geophysical_Union) in December 2006 asserted that even a small-scale, regional nuclear war could produce as many direct fatalities as all of [World War II](http://en.wikipedia.org/wiki/World_War_II) and disrupt the global climate for a decade or more. In a regional nuclear conflict scenario in which two opposing nations in the [subtropics](http://en.wikipedia.org/wiki/Subtropics) each used 50 Hiroshima-sized nuclear weapons (ca. 15 kiloton each) on major populated centers, the researchers estimated fatalities from 2.6 million to 16.7 million per country. Also, as much as five million tons of [soot](http://en.wikipedia.org/wiki/Soot) would be released, which would produce a cooling of several degrees over large areas of North America and [Eurasia](http://en.wikipedia.org/wiki/Eurasia), including most of the grain-growing regions. The cooling would last for years and could be "catastrophic" according to the researchers.[18]

**Sub-strategic use**

The above examples envisage nuclear warfare at a strategic level, i.e. [total war](http://en.wikipedia.org/wiki/Total_war). However, many nuclear powers are believed to have the ability to launch more limited engagements.

The United Kingdom has reserved the possibility of launching a sub-strategic nuclear strike against an enemy, described by its Parliamentary [Defence Select Committee](http://en.wikipedia.org/wiki/Defence_Select_Committee) as "the launch of one or a limited number of missiles against an adversary as a means of conveying a political message, warning or demonstration of resolve". This would see the deployment of [strategic nuclear weapons](http://en.wikipedia.org/wiki/Strategic_nuclear_weapons) in a very limited role rather than the battlefield exchanges of [tactical nuclear weapons](http://en.wikipedia.org/wiki/Tactical_nuclear_weapons). Such a strategy is based on the assumption that an enemy country such as the [Russian Federation](http://en.wikipedia.org/wiki/Russian_Federation) or the [People's Republic of China](http://en.wikipedia.org/wiki/People%27s_Republic_of_China) with a larger stockpile of nuclear weapons would not retaliate with far greater force than had been used by Britain.[*[citation needed](http://en.wikipedia.org/wiki/Wikipedia:Citation_needed)*]

British [Trident-armed](http://en.wikipedia.org/wiki/Trident_missile) [*Vanguard* class](http://en.wikipedia.org/wiki/Vanguard_class_submarine) nuclear submarines are believed to carry some missiles for this purpose, potentially allowing a strike as low as one [kiloton](http://en.wikipedia.org/wiki/Kiloton) against a single target. Former Defence Secretary [Malcolm Rifkind](http://en.wikipedia.org/wiki/Malcolm_Rifkind) argued that this capacity offset the reduced credibility of fullscale strategic nuclear attack following the end of the Cold War.

Commodore [Tim Hare](http://en.wikipedia.org/w/index.php?title=Tim_Hare&action=edit&redlink=1), former Director of Nuclear Policy at the [British Ministry of Defence](http://en.wikipedia.org/wiki/British_Ministry_of_Defence), has described it as offering the Government "an extra option in the escalatory process before it goes for an all-out strategic strike which would deliver unacceptable damage".[19]

However, this sub-strategic capacity has been criticized as potentially increasing the acceptability of using nuclear weapons. The related consideration of new generations of limited-yield nuclear weapons by the United States has also alarmed anti-nuclear groups, who believe it will make the use of nuclear weapons more acceptable.

Similarly, the United States adopted a policy in 1996 of allowing the targeting of its nuclear weapons at "non-state actors" armed with [weapons of mass destruction](http://en.wikipedia.org/wiki/Weapons_of_mass_destruction).[20]

Nuclear terrorism

*Main article:* [*Nuclear terrorism*](http://en.wikipedia.org/wiki/Nuclear_terrorism)

[Nuclear terrorism](http://en.wikipedia.org/wiki/Nuclear_terrorism) by non-state organizations is an unknown factor in nuclear deterrence thinking, as states possessing nuclear weapons are susceptible to retaliation in kind, but sub- or trans-state actors are not. The collapse of the Soviet Union led to the possibility that former Soviet nuclear weapons might become available on the [black market](http://en.wikipedia.org/wiki/Black_market) (so-called 'loose nukes'), while no warheads are known to have been mislaid, it has been alleged that [suitcase-size bombs](http://en.wikipedia.org/wiki/Suitcase_bomb) might be unaccounted for.

Another possible nuclear terrorism threat are devices designed to disperse radioactive materials over a large area using conventional explosives, called [dirty bombs](http://en.wikipedia.org/wiki/Dirty_bomb). The detonation of a dirty bomb would not cause a nuclear explosion, nor would it release enough radiation to kill or injure a lot of people. However, it could cause severe disruption and require potentially costly decontamination.[21]